Aden

743
178 a few years ago there came into being the Protectorate Health Service which owes much to Dr. N.L. Corkill, M.M., M.S.M., M.D., who came with me to Al Qara. Health Units have been built on standardised lines in all the States where they did not previously exist; and from money contributed by the Fadli and Lower Yafa States, a hospital has been built on the boundary between these two States in a central, though rather wind-swept, position reasonably easy of access to the people of the Abiyan plain. In Mukalla there is another hospital and up in the Wadi Hadhramaut are two small hospitals at Shibam and Saiyun.

759 The Health Assistants are trained in simple medicine and hygiene at the Fadli-Yafa hospital or in Mukalla and then go to one of the Health Units where, not only do they attend to surgery patients, but also tour the neighbouring villages and are responsible for reporting any outbreak of an infectious disease that may come to their notice to their headquarters in Aden or Mukalla, depending on which part of the Protectorate they are serving.

744
164 Anti-malarial measures and Public Health work are also the responsibility of the Health Service and the decrease in the incidence of malaria and other mosquito and fly-borne diseases since the inception of the Service, is remarkable. At the same time and within the limits imposed by inadequate staff, attention is being paid to the general health of school children with particular emphasis on diseases of the eye. With adequate funds and personnel it would be possible if not to eliminate completely so to reduce trachoma that impaired vision and blindness from this cause would be a rarity rather than, as it still is today, all too common.

743
648 Today, as in the past, the Royal Air Force is always ready to fly Medical Officers into the Protectorate to deal with casualties in inter-tribal scrimmages or to attend to the desperately ill who are beyond the reach or the capacity of the Health Assistants, and there are many tribesmen and women who owe their lives to the Royal Air Force. Stretcher cases from the remotest areas are flown to hospital in Aden and no call for help is ever unanswered because the sender was too humble or

2: Hickinbotham G-4, 5 (ca. 1931-ca. 1957)
1958 MM1 Aden MM1

soon showed that they could be educated, that they were capable of doing more than just manual labour and that with understanding and encouragement there was very little that was beyond their capabilities. They began to resent the presence in their midst of an army of Indian clerks and artisans doing work which, not always with justification at that time, they considered they were capable of doing and which should be theirs by right. Unfortunately, this resentment was not confined to the Indian workers, but was directed as well against their European employers which did not make for happy racial or labour relations in the future.

The general condition of Arab labour in the Colony when I first came to know Aden in the nineteen-thirties can only be described as disgraceful. There were no superannuation benefits, and as wages left no margin between income and expenditure, nothing could be saved against old age and sickness. There were no holidays with pay, and most workers had to find their own living accommodation, and the vast majority received no medical treatment or benefit through their employers. Labour relations, as we now understand that term, did not exist. There was no form of consultation between master and man and the authority of the master was absolute.

Coal and cargo coolies were provided with accommodation; they were housed in long sheds, owned by the coaling and stevedoring companies, in grossly overcrowded conditions without any washing or sanitary arrangements, the nearby beach just across the main road served as a combined bath and lavatory. The owners never had the smallest idea who lived in these dormitories and what went on there after dark, which was probably just as well for their peace of mind in this town where women were closely guarded and youth was uncontrolled.

By the end of the World War no very great improvement in conditions was noticeable and the housing shortage, already acute, was rendered more so by a Town Planning Scheme which virtually paralysed all building operations for two years, and achieved little else except an impracticable scheme which was brought into force in a modified form and then,

3:Gt. Brit. . Colonial Office G-3 (1938) 1940 MM1 Aden MM1

743 A small Lunatic Asylum is situated outside the walls of the Civil
758 Hospital and is administered from it.

Health work is a very important feature in the medical
[744] organization of the Colony. The proximity of Aden
ports which are subject to periodic infections makes the
inspection of vessels a vital matter, and in addition the
services of the Port Health Officer are in constant demand to assist
the masters of the many cargo ships which use the port and carry
no doctor. Passengers and members of the crews requiring hospital
treatment are accommodated in the European General Hospital, or,
if the illness is an infectious one, in suitable isolation. A few cases
of chickenpox and three cases of modified smallpox were landed
from shipping during 1938.

743 In the European General Hospital 66 residents of Aden and 155
744 patients from ships were treated as in-patients during the year.
In all 23 different nationalities were represented.

During 1938, 2,178 Bills of Health were issued to mechanically propelled vessels and 1,609 to native craft.

V.—HOUSING

General

342 Houses in Aden are of stone masonry, except at Sheikh Othman
647 where they are mostly built with sun-dried bricks.

656 The control of housing in Aden is vested in the Executive Committee of the Settlement, and plans for new buildings and reconstructions are passed by them after scrutiny by the Medical Officer of Health and the Settlement Engineer.

Particular attention is paid to efficient lighting and ventilation. Each residential building is provided with sanitary and kitchen accommodation separated from the living rooms by open court-yards or by large shafts open to the sky.

Most of the houses are provided with floors made of cement-concrete; this is insisted upon in all new buildings, and the height of the houses is never allowed to exceed the width of the streets.

Back-to-back houses are not allowed; a few still exist in the village of Maala, but these are being demolished as opportunity occurs.

[514 364] At the rear of all houses there are open spaces from 5 ft. to 10 ft. wide. They are called sweeper passages, and the sanitary accommodation of the houses abuts on to these spaces and is drained into them. Each such passage is connected with the main drainage system in all divisions of the Settlement except Maala, where it is connected with a large soak pit.

Every building plan is carefully scrutinized by the Public Health Department before construction is allowed.

4:Gt. Brit., Colonial Office G-3 (1937) 1939 MM1 Aden MM1

Military Garrison.

701 The Military Garrison of the Colony is under the immediate command of an Air Officer Commanding and consists of Air Headquarters with its various departments, Headquarters Royal Artillery, 9th (Minden) Heavy Battery, R.A., 20th (Fortress) Company, R.E., No. 8(B) Squadron, R.A.F., a Section of Armoured Cars and the Aden Protectorate Levies. Air Headquarters, the Royal Artillery, the Royal Engineers and the Section of Armoured Cars are stationed at Tawahi (Steamer Point), while No. 8(B) Squadron, R.A.F. is at Khormaksar and Sheikh Othman.

There is a Naval Office (H.M.S. *Norfolk* III) in charge of the Naval Officer-in-Charge who also exercises general control over the Naval wireless station at Khormaksar.

III.—POPULATION.

161 According to the census of 1931, the total (civilian) population of the Aden Settlement was 45,992. This excludes the military forces and the population of Perim.

162 The following table shows the population distribution by caste and sex:—

No.	Caste.	Sex.	
		Males.	Females.
1	Arabs	18,388	10,341
2	Indian Mohammedans	2,829	2,393
3	Somalis	2,070	2,107
4	Hindoos	1,992	622
5	Jews	2,114	2,006
6	Parsis	236	96
7	Native Christians	339	207
8	Europeans	213	39
	Total	28,181	17,811

167 The total numbers of males and females show a marked disproportion, the males being 28,181 in number, whereas the females are only 17,811. This is due to the fact that most of the Arabs of the trade and coolie class from the interior come to Aden without their women folk.

IV.—HEALTH.

744 The staff of the Medical Department in Aden consists of the Senior Medical Officer, one Civil Surgeon, two Resident Medical 743 Officers and eight Assistant Medical Officers. There is a fully-qualified Lady Doctor attached to the Civil Hospital in Crater. The Senior Medical Officer is also Port Health Officer and has charge of the European General Hospital. There is also a Medical Officer of Health with an adequate subordinate staff.

5:Gt. Brit., Colonial Office G-3 (1947) 1949 MM1 Aden MM1

culties in providing buildings and staff necessarily limited the rate of expansion. One of the main features of educational development during the year was the successful conversion of buildings to house the expanded Government Secondary School. The release of classrooms previously used by the Secondary School enabled the Primary School to take in a greater number of pupils. Another satisfactory development during the year was the institution of a teacher-training course at the Government Girls' School, Crater. The lack of local teacher-training facilities for male teachers was met by sending abroad a number of students to obtain higher qualificatons in the teaching profession.

The year in general was a period of consolidation, but progress was made in all Government schools. This progress was also reflected in some of the grant-aided schools. In particular, the Gujerati School Committee were granted a site for their new school and plans for this were begun. The cost of the building and the recurrent expenditure will be subsidised in part by Government.

Medical and Health Department

The accommodation at the Civil Hospital was filled to capacity throughout the year.

The new appointment of an officer with specialist experience in venereal and skin diseases has proved most beneficial to the community.

Besides a marked improvement in the treatment of social diseases, the cure of ulcer cases—hitherto a difficult matter—received special attention, with the result that the overcrowded ulcer ward with its heavy quota of apparently incurable cases is now a thing of the past.

The treatment of pulmonary tuberculosis continued to yield excellent results. Lack of hospital accommodation has been overcome, in part, by the institution of domiciliary treatment.

The granting of facilities for post-graduate study has already proved its worth. One Senior Assistant Medical Officer was made a Fellow of the Royal College of Surgeons of Edinburgh and another obtained the Diploma in Tropical Medicine of Calcutta, coming second in the list of candidates.

The increase in the work of the Maternity and Child Welfare Clinic shows that it meets, as far as it can, a vital community need. A reduction in the distressingly large numbers of infants who die before reaching the age of 12 months must be the main object of the Clinic's activities. The next most important point is the raising of the standard of midwifery. A course of instruction, followed by an examination, was instituted for local midwives.

Public health measures continued to be vigorously applied. No case of serious communicable disease occurred during the year.

A heavy burden was laid upon the Port Health Staff by the outbreak of cholera in Egypt. All possible precautions were taken to prevent the entry of cholera here and the staff undertook much additional work.

The installation of the electro-therapeutic apparatus at Steamer Point was an important addition to the facilities for treatment, and the Colony

5:Gt. Brit., Colonial Office G-3 (1947) 1949 MM1 Aden MM1

fortunate to have a medical officer with special knowledge of this branch of medicine.

Lack of replacements and absence of officers on leave threw increased responsibilities and work on the remainder of the Medical and Health Staff.

Welfare

The Welfare Officer for whom provision appeared in the Estimates was not appointed, but a locally born Assistant Welfare Officer was appointed after spending two years in the United Kingdom studying social welfare.

Details of activities of other Government Departments will be found in Part II of this Report under appropriate chapters.

PRISONS

Until the riots broke out in early December there had been a welcome decrease in the prison population. This had amounted to 24 per cent. during the first 10 months of the year, in comparison with the corresponding period in 1946.

At the beginning of the year the installation of an improved system of sanitation throughout the prison, which was begun in 1946, was completed. Increased facilities for the segregation of prisoners were provided, and substantial repairs and alterations to many of the prison buildings effected. The kitchen was remodelled and enlarged.

Throughout the year the health of the prisoners was satisfactory, and discipline well maintained.

ELECTRICITY DEPARTMENT

Two generating sets were completely overhauled by a Metro-Vickers erection engineer.

New sub-stations were erected at Ras Boradli, Maidan Crater, and Maalla.

Shortage of materials prevented any large-scale changeover from overhead to underground cables, but the Maalla area was cleared of overhead high-tension lines to release ground for building purposes.

Further details will be found in Part II.

COMMUNICATIONS

Civil Aviation

During the year the Crown Counsel, because of his personal qualifications, was appointed Director of Civil Aviation in addition to his normal duties.

Negotiations with the Royal Air Force to obtain joint-user rights at Khormaksar resulted in successful agreement. A separate civil enclave will be built at Khormaksar to the east of the Sheikh Othman road, just south of the main east-west runway.

During 1947 temporary licences were granted to Ethiopian Airlines,

5:Gt. Brit., Colonial Office G-3 (1947) 1949 MM1 Aden MM1

take shape. The appointment of an Assistant Medical Officer with special knowledge of venereal and skin diseases was a definite step forward in the campaign against social diseases. It has now been possible to organise better treatment for both in-patient and out-patient venereal-disease cases at the Civil Hospital.

In addition, systematic treatment of tropical ulcers was started, with the result that the hitherto overcrowded ulcer ward was markedly improved owing to the reduction in the time needed to effect a cure.

The Civil Hospital staff was strengthened by the appointments of a Medical Officer with laboratory experience, a Surgical Specialist, and a Radiologist.

The installation of a new X-ray plant, the construction of a much-enlarged laboratory, the erection of a new 44-bed ward for pulmonary tuberculosis and an additional operating theatre were all completed during the year.

With the exception of pulmonary tuberculosis, all the principal causes of death showed a general decrease, though the death-rate exceeded that of 1946. This was due to the deaths during the civil disturbances.

The number of deaths from pulmonary tuberculosis rose from 191 in 1946 to 241. The reason for this was more accurate diagnosis due largely to increased X-ray examinations. Over 1,000 such examinations were made during the year, compared with an annual average of 20 to 30 before 1945.

As a result of the disturbances in December no cases could be accommodated in the new tuberculosis ward, which had to be used for emergency purposes. A severe shortage of beds led to the institution of domiciliary treatment and the monthly average of cases visited in their homes was between 50 and 60. Apart from the fact that a surprisingly large proportion of cases showed improvement, this extension of anti-tuberculosis activities was of public health importance as it was possible to teach simple hygiene in the homes.

The civil disturbances in December threw a tremendous burden upon the staff and resources of the Civil Hospital. The fact that the administration successfully stood the test of the sudden admission of scores of severely wounded cases reflected great credit on the staff, particularly upon the locally trained members who rendered loyal and efficient service.

Attendance at the Maternity and Child Welfare Clinic continued to increase and there is no doubt that the instruction given at the various out-patient clinics is beginning to have an important effect on a community which has been, until quite recently, completely ignorant of the principles of mothercraft.

During the last quarter of the year, the outbreak of cholera in Egypt caused a big increase in the work of the Port Health staff. Not only had strict supervision to be exercised over all entrants from infected ports but a large number of in-transit passengers and crews had to have anti-cholera inoculations before proceeding to Egyptian ports. No case of cholera, or of any of the other quarantinable diseases, occurred.

6:Gt. Brit. . Colonial Office G-3 (1948) 1950 MM1 Aden M M1

743 X-ray examinations were performed. In previous years the annual figures for such work were in the neighbourhood of 500.

The encouraging aspect of the Civil Hospital's activities was the marked rise in female out-patient attendances, 7,447 as compared with 5,573 in 1947.

[752] The creation of the temporary post of Sister-Tutor resulted in regular training courses for the subordinate nursing staff.

The opening of a new temporary ward for male T.B. patients has increased the number of male beds from 21 to 55.

Communicable Diseases.

164 *Smallpox.* There were two imported cases landed from ships. No
744 case of the other Convention diseases occurred.

Malaria. There was a sharp rise in the number of cases reported from the outlying town of Sheikh Othman. In view of this a combined search by the staff of the Public Health Department, of No. 7 R.A.F. Hospital and of the Keith Falconer Mission Hospital was instituted in that area. No evidence at all was found of anopheline breeding and it was obvious that the infection had been contracted, at any rate in the great majority of cases, outside the boundaries of the Colony.

Venereal Diseases. There was a considerable increase in the notification figures for 1948 following a drive to ensure that medical practitioners notified cases as required by the Venereal Diseases Amendment Ordinance, 1947.

The subvention to the Keith Falconer Mission Hospital for its Venereal Disease Treatment Centre was increased from £225 to £750 in order to assist the campaign against venereal disease.

A gratifying aspect of the work of the Venereal Diseases Officer was the large decrease in the number of defaulters, particularly in respect of syphilis. Hitherto the defaulting rate has been over 50 per cent. The figures for the Venereal Disease Treatment Centre in 1948 are:

	Number treated	*Number cured (clinically)*	*Defaulters*
Syphilis	1,992	1,957	35
Gonorrhoea	1,126	1,007	119
Chancroid	206	206	—
Other V.D. including Granuloma Inguinale	177	174	3

Dysentery and Typhoid. Figures for dysentery are not yet available but no untoward outbreak has occurred. The returns for typhoid and paratyphoid showed 15 cases notified, exactly the same figures as in 1947. Whereas in 1947 in seven of these cases the infection was contracted, as far as could be ascertained, in Aden, during 1948 only one case was of local origin, the remaining 14 cases were from outside the Colony.

744 *Pulmonary Tuberculosis.* The year has been marked by considerable
743 progress in the anti-tuberculosis campaign due to the full-time services

6:Gt. Brit., Colonial Office G-3 (1948) 1950 MM1 Aden MM1

of the X-ray department, an increase in hospital beds and additional staff provided by the Aden Society for the Prevention of Tuberculosis—one full time T.B. Inspector and one voluntary home visitor.

The new male T.B. Ward, the provision of 17 beds in the Jewish Emergency Hospital and the increase of beds in the T.B. Hospital, Sheikh Othman, mean that there are 100 beds for pulmonary tuberculosis patients compared with 10 in 1944.

X-ray examinations, screening or film, totalled 2,160 compared with 20 in 1944. By the end of the year another 100 cases were being treated in their own homes as compared with none in 1944. While the total of notified cases rose to 481 for the year, only 159 of these were Aden born residents. In 1944 no notifications were entered and in 1947 the number was 282.

The results of treatment continued to be satisfactory, over 40 cases being discharged during the year as fit to resume work.

The most notable advance was in the introduction of regulations whereby Government employees contracting pulmonary tuberculosis in the course of their duties were granted full-pay leave if it was considered by a Medical Board that they would benefit sufficiently from such treatment to return to work. The result has been that cases have come up for investigation at an early stage as they knew that they would receive pay throughout their course of treatment.

Of 18 Government employees so entitled, seven have been treated and resumed work, 10 are under treatment and making good progress, one has not improved. There were also two cases who elected to take gratuities and return to Somaliland Protectorate. Both have since got much worse.

These figures show that the standard of recovery is high and it is further proved by the following small but interesting figures. Since 1945 four male and two female nurses contracted pulmonary tuberculosis, of these two were sputum negative; of these cases, five are now back on full nursing duties, and the sixth case was on the point of being discharged as sufficiently well to resume work, when he had a severe mental breakdown and had to be medically boarded on this account.

Deaths from T.B. were 209 as compared with 244 in 1947.

Maternity and Child Welfare

The Maternity and Child Welfare Clinic has shown a welcome increase in attendances by the Arab community. All other communities have taken full advantage of its facilities during the last two years but Arab women have hitherto been held back by old-fashioned ideas. This prejudice is beginning to break down and this is proof that the excellent work done by this institution is now being recognised more adequately.

A gratifying addition to the already heavy routine duties of the Medical Officer and her staff of midwives was the voluntary undertaking of a course of training for local midwives, all of whom are quite untrained.

The course proved very popular and the average attendance was 31, which includes a considerable proportion of the women known to be earning their livelihood by undertaking midwifery work.

6:Gt. Brit., Colonial Office G-3 (1948) 1950 MM1 Aden M M1

tary arrangements, was begun under the aegis of the Aden Settlement in 1943, and this policy is being continued by Government.

During the war and for a period afterwards, for a variety of reasons (principally large military constructional works, increase in the strength of the Garrison, and famine in the hinterland), the floating population increased considerably, and in the absence of proper accommodation were perforce allowed to construct and live in *kutcha* huts in specially demarcated areas.

While control is exercised as far as is possible to prevent epidemics these are slum areas, which can only be cleared by Government building several hundred working-class houses at a sub-economic rent; areas for this purpose are being reserved under the Town Planning Scheme.

The Town Planning Scheme is gradually taking shape, but in the absence of adequate trained staff, the work can only make slow progress.

SOCIAL WELFARE AND RELIEF

There are no social insurance schemes in Aden Colony.

A Government social welfare organisation is being built up gradually, but has been handicapped through lack of staff. A Poor Relief Committee, financed partly through public subscriptions, but notably through Government which contributes Rs. 50,000 per annum, dispenses relief to the aged and infirm. A voluntary committee also collects materials and funds, especially for children's welfare.

There are no social welfare officers or probation officers at present; the appointment of a social welfare officer has been approved, but he has not yet been appointed. An Assistant Welfare Officer who was trained in the United Kingdom arrived in December, 1947, and has taken up his duties.

Chapter 8: Legislation

Twenty-seven Ordinances were passed during the year 1948, of which the following are the more important:

Income Tax (Relief Amendment) Ordinance, 1948, No. 3, which gives family relief in respect of one wife and not more than four children. The loss involved by this concession has been provided against by increasing taxation in the higher grades.

Prisons (Amendment) Ordinance, 1948, No. 4, which carries out the recommendation of a locally appointed Prison Reform Committee by reducing the number of prison offences which are punishable with whipping.

Widows' and Orphans' Pensions (Amendment) (No. 2) Ordinance, 1948, No. 19, which provides *inter alia* that a certain class of employee of the Aden Port Trust shall be eligible to contribute.

Aden Protectorate Levies (Amendment) Ordinance, 1948, No. 20, which provides for the grant of pensions to native officers and enlisted clerks.

Appeals to the Court of Appeal Ordinance, 1948, No. 22, which

7: Gt. Brit., Colonial Office G-3 (1949-50) 1951 MM1 Aden mm1

On an estimated basis of 100,000 population the death rate for 1949 was 16·58 per 1,658 deaths 376 occurred among immigrants, as Aden receives many sick from adjoining territories where no health services exist. 165

The Civil Hospital is the only well-equipped hospital in a large area and among both out-patients and in-patients an analysis of attendances shows that 60 per cent of those seeking treatment come from outside the Colony, the major portion being alien Yemenis who have no claim either by residence or by nationality on the social services of Aden. Their only claim is on the score of humanity, a plea which is difficult to resist for many of them have dragged themselves along for distances varying from 150 to as much as 500 miles to obtain care and attention in Aden. 743 167

The various departments of the Civil Hospital showed evidence of increased activity. On the surgical side major operations exceeded 1,000, the average for previous years having been between 400 and 500. 743

Operations for diseases peculiar to women were performed by a woman medical officer. This was the first time that the services of a skilled woman surgeon were available and this innovation was particularly welcome in a territory where Muslim tradition precludes a number of women from seeking surgical treatment at the hands of male doctors. [759]

Other improvements included the establishment of a physiotherapy department and the purchase of a wide range of modern equipment for the eye department.

The opening of another ward for pulmonary tuberculosis resulted in one-third of the beds in the Civil Hospital being allocated for the treatment of this disease. The T.B. Ward at Sheikh Othman was abandoned. Plans for another ward for female T.B. patients, the gift of the Aden Society for the Prevention of Tuberculosis, were approved and its construction was begun.

During this two-year period about 42,000 Yemenite Jews passed through the transit camp on their way to Israel. While the bulk of the camp staff were recruited from Israel, the responsibility for camp sanitation and for providing specialist medical and surgical services fell on the Medical Department. 744 ● 167

Communicable Diseases

Smallpox. Despite the importation of a number of smallpox cases and the occurrence of a smallpox epidemic in the neighbouring port of Mukalla, the disease did not spread. 164

There were two imported cases of typhus, one by sea and one by land.

Venereal Diseases. The campaign against the social diseases made steady progress while the marked reduction in the number of defaulters reported in 1948 was well maintained.

Dysentery and typhoid. The incidence of dysentery, both bacillary and amoebic but particularly the latter, showed a marked falling-off.

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden MM1

658 Technical College in November, 1951, the only remaining capital project was the Intermediate School for Girls.

Health

Although a special medical officer for schools was not appointed the amount of medical and dental attention was increased. The system of school dressers and of attendance at hospital was improved. There was no epidemic during the year. The supply of school milk was extended to the full three terms instead of, as previously, two terms.

HEALTH

General

164 Although the port is astride the main sea route between the Indian Ocean and the Mediterranean Sea it has remained conspicuously free 744 from any of the Convention diseases. Plague, cholera, smallpox, yellow fever and typhus did not occur in the Colony during 1951–52 —indeed they have not occurred as endemic diseases for a number of years. Many ships and dhows of many nationalities reach the port in transit to other parts of the world, but vigilance by the Port Health Authorities and the Public Health Department combined with growing appreciation of the value of the International Sanitary Control measures have ensured the continued absence of epidemic diseases. During the latter part of 1952 influenza was imported from Europe and elsewhere, and caused the sickness rate to rise. Fortunately this disease did not increase the mortality rate.

From an epidemiological point of view the hinterland of Aden presents greater problems than do the sea and airborne traffic except, probably, the importation of influenza which is more likely to arrive by sea and air than from the interior.

An outbreak of plague in the Yemen in 1951 was countered in Aden by dusting immigrants from the Yemen with 10 per cent D.D.T. at the Police posts on the outskirts of the Colony, and anti-rat measures were intensified.

364 The state of environmental hygiene and sanitation continued to be fairly satisfactory, there being a marked absence of flies and mosquitoes. Sanitation in certain areas still requires attention and this is being examined with a view to providing better housing conditions.

Maternity and Child Welfare

165 The infant mortality rate has shown a steady decline over the last 10 years. In 1951 the crude rate was 156.96 per 1,000 live births, in 1952 it was 139.92 per 1,000. As a comparison it may be mentioned that in 1943 the crude rate was 238.97 per 1,000. Increased attention has been given to the maternity and child welfare aspects of the Medical Department's work and during April, 1952, a new block of wards was in the process of being added to the existing Maternity and Child Welfare Hospital and Clinic. In order to expand the influence of maternity and child welfare work in homes four Home Visitors were engaged. These Visitors have proved invaluable ; they were recruited

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden MM1

from local Arab women who observed purdah and were, therefore, able to gain easy access to the homes of others who also observed the purdah system.

The maternrl mortality rate fell from 3.07 per 1,000 live and still-births in 1951 to 2.23 per 1,000 in 1952.

Diseases

Diseases attributable to water-borne infection were entirely absent because the water supply is protected and chlorinated. The cases of enteric fever or dysentery which do occur are of a sporadic nature, many of them having been infected outside the Colony.

The death rate from pulmonary tuberculosis showed a steady decline over previous years. In 1950 the death rate was recorded as 113 per 100,000 of the population ; in 1951 100 per 100,000 ; in 1952 84 per 100,000. During 1952 the World Health Organisation sent an international team, comprising one medical officer and one nurse, to carry out tuberculin testing of the local population below the age of 18 and to inoculate all non-reactors with B.C.G. vaccine. The team stayed in Aden for four months and tested approximately 31,000 people, of whom 7,750 non-reactors were vaccinated, approximately 14,000 were positive reactors and 8,000 or so persons failed to reappear for inspection. It is hoped to follow this visit up by asking the World Health Organisation to undertake a tuberculosis survey of the Colony.

The Colony remained free from malaria and the Aedes index fell to the lowest yet recorded figure of 0.007.

The principal causes of mortality in 1951 were :

Diarrhoea and enteritis	304
Other fevers	266
Senility	171
Pneumonia and broncho-pneumonia	147
Tuberculosis of the respiratory system	100
Congenital malformations and diseases peculiar to first year of life	94
Diseases of the heart	62
Violent or accidental deaths	66
Other diseases of the respiratory system	48

Modern treatment for these diseases is given by the Civil Hospital (350 beds) and the Church of Scotland Mission (80 beds) and, when required, generous assistance is provided by the R.A.F. medical officers stationed in Aden, both in consultative and specialist capacities. Steps have been taken to introduce the international statistical classification of diseases, injuries and causes of death so that closer comparison can be made with other countries.

Prevention of the diseases listed above follows the usually accepted procedures but special emphasis is placed on a purified water supply, high standard of sanitation and the necessity for legislation to control itinerant vendors of foodstuffs. Milk, either goat's or cow's, is usually boiled before use and does not constitute a grave danger in the spread of disease.

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden MM1

Medical and Public Health Department

647 The Medical Department is divided into three sections under the 743 control of a Director. The three sections include a Medical Division, 744 Public Health Division and Port Health Division.

The Medical Division is responsible for the curative side and comprises a large hospital of 350 beds and three smaller dispensaries for the treatment of out-patients.

The Public Health Division is responsible principally for environmental hygiene and sanitation. In a more specialised field greater attention is being paid to tuberculosis. It is intended in the future to lay more emphasis on the prevention of tuberculosis and towards this end one of the first priorities is the recruitment of a whole-time tuberculosis officer.

Preliminary plans have been produced for the construction of a new hospital.

759 The following medical staff were in the Colony at the end of 1952 :

	Government	*Mission*	*Companies*	*Private Practice*
Director of Medical Services	1			
Medical Superintendent	1			
Medical Superintendent, Clinic	1			
Surgical Specialist	1			
Medical Officers	9	3	9	11
Assistant Medical Officers	9			
Lady Assistant Medical Officers	2			
Matron	1			
Nursing Sisters	15	2		
Dental Officer (part time)	1			
Assistant Dental Officer	1			
Nursing Orderlies	148			

Expenditure

652 Central Government capital expenditure during 1951 was estimated at £13,000 and recurrent expenditure on the whole Medical Department was estimated at £155,000.

HOUSING AND TOWN PLANNING

[161] 362 Because the population is continually increasing, there is still a serious housing shortage and it is estimated that there are 25,000 squatters' huts in the Colony. Delay over the preparation of town planning schemes held up housing development, which is now getting under way. Outline town plans for most of the areas of the Colony are almost complete.

Government has already built 524 working-class houses at Sheikh Othman, with the assistance of a 33⅓ per cent grant from Colonial Development and Welfare funds. A further 240 houses are planned for the next two years. Several of the large employers of labour have embarked on extensive housing schemes for their staff.

9:Møller et al D-5 (1952)1954 MMI Aden MMI

Bull. Org. mond. Santé
Bull. Wld Hlth Org. } 1954, 10, 113-125

BCG-VACCINATION CAMPAIGN IN ADEN COLONY

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SYNOPSIS

A mass BCG-vaccination campaign was undertaken in Aden Colony during February-May 1952 by WHO/UNICEF in co-operation with the Directorate of Medical Services. Over 31,000 persons (about one-fourth of the total population) were given an intradermal 5 TU test, and 22,000 returned for the reaction to be read. Of these, about one-third were classified as negative and all but a very few of them were given an intradermal injection of BCG vaccine. Of those vaccinated, over half were children of school-age. The results obtained in this campaign are described with particular reference to the number and size of tuberculin reactions, and the results of follow-up examinations in nearly 2,000 schoolchildren.

The international mass BCG-vaccination programmes now being assisted by WHO and United Nations Children's Fund (UNICEF) stem from the work started by Danish Red Cross missions to several war-torn countries early in 1947. Soon joined by the Norwegian Relief for Europe and the Swedish Red Cross, and, in March 1948, by UNICEF, the International Tuberculosis Campaign (ITC) conducted mass BCG programmes in 23 countries, tuberculin-testing a total of nearly 30 million persons and vaccinating about 14 million during the next three years. WHO assisted the ITC by giving technical guidance ; the WHO Tuberculosis Research Office compiled and analysed the results and prepared reports of the campaigns. Reports have now been published documenting the work of the ITC in 16 countries.

Since June 1951, when the ITC ended, international BCG programmes have been conducted by WHO/UNICEF. The present report is the first of a series documenting the work assisted by WHO/UNICEF. The report describes briefly the organization and results of the vaccination programme

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in Aden Colony, with special reference to the pattern and prevalence of naturally acquired tuberculin sensitivity and the level of tuberculin sensitivity induced by BCG vaccination in the school-aged population.

The Campaign

At the request of the Government of Aden, a BCG campaign was started by WHO and UNICEF, in co-operation with the Directorate of Medical Services, on 28 January 1952.

The campaign was planned for a systematic coverage of children and young adults throughout the Colony. During the first month, testing and vaccinating were limited to the schoolchildren ; in the following months, the non-school population was summoned to public centres established in the different sectors.

Intensive propaganda by means of pamphlets, posters, loudspeakers, film shows, and meetings resulted in a reasonably good turn-out of the population, although it was found that relatively few women attended the centres. A house-to-house campaign was therefore scheduled to follow the main campaign, which ended on 20 May 1952. The material presented in this report covers the main campaign only.

The pre-vaccination testing and the vaccinating were carried out by a team consisting of one doctor and two nurses : one of the nurses was assigned to the team by the Government, the doctor and the other nurse were WHO staff members. A single Mantoux 5 tuberculin unit (TU) test was given in the dorsal aspect of the left forearm ; the tests were read at 3-4 days, reactions of 5 mm or more of induration being classified as positive. Vaccination of negative reactors was made by intradermal injection in the left deltoid region, the dose being 0.075 mg of BCG culture in 0.1 ml of diluent.

The tuberculin used was purified protein derivative (PPD) lot RT XXII, prepared by Statens Seruminstitut, Copenhagen, and the vaccine was prepared by the Agouza Serum and Vaccine Institute, Cairo. Both the tuberculin and the vaccine were sent to the team in refrigerated containers and were kept cold in the field when not in use. To shield the vaccine from the traumatic effect of sunlight when the ampoules were being used, they were placed in wooden blocks and covered with paper cups ; and vaccination was always performed indoors or on shaded verandas.

Statistical data on the campaign are derived from two types of records made during the work : individual cards for 18% of the population tested and group cards for the remainder. Individual cards were used only in schools where each person tested could be accurately identified ; these records were to obtain information on the pattern of naturally acquired tuberculin sensitivity and, later, the response to BCG vaccination. (See sample card, Annex 1.) The name, age, and sex of each student were entered

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on a card on the first visit, and a record was made of the test given. On the next visit, when the reactions were read, measurements of the size of the reaction (*transverse diameter of induration*) were recorded and, if vaccination was given, this was noted together with the lot number of the vaccine and the initials of the vaccinator. Follow-up visits were made after several months to examine the post-vaccination responses.

Group cards were used for the testing and vaccinating in public centres and in a few of the schools. (See sample card, Annex 2.) The number of persons tested during the first visit to a centre was simply tabulated on one side of a single card by three broad age-groups : 0-6 years, 7-14 years, 15 years and over. On the second visit, the number of positives, vaccinated, and negatives not vaccinated, in each of the three age-groups, was recorded on the other side of the same card. Each person tested was marked with a colour stain above the site of the test, the shape of the mark indicating the day of the week on which the test was given ; this made it possible on the reading day to check when the test had actually been given.

The data reported on both kinds of cards were tabulated in the monthly statistical reports giving the overall results of the campaign. The numbers of tested, positives, vaccinated, and negatives not vaccinated during the period February-May 1952 are given in table I by month, population group, and age-group. Altogether, 31,287 persons were tuberculin-tested; of these, 22,110 (about 71%) returned to have the test read. Percentages of completed tests among the total numbers tested, according to population group and the three age-groups, are as follows :

Age-group (years)	*School-children*	*General public*	*Total*
0-6	89.6	53.7	56.8
7-14	96.1	71.3	80.6
15+	96.6	64.4	66.3
All ages	95.7	64.8	70.7

It will be seen that the percentage of schoolchildren completing the test is uniformly high, averaging around 96 for all age-groups. In contrast, records for the non-school population show that the percentage varies from about 54 for the age-group 0-6 years to about 71 for the age-group 7-14 years, with an average of only 65 for completed tests.

The figures of the 1946 census gave 52,657 males and 29,202 females. About 80% of the population are Arabs. In 1952, the total population was estimated at 100,000-120,000. The campaign aimed at testing everybody aged 1-18 years, and it is estimated that roughly half of this age-group was covered by the campaign in terms of completed tests. As shown in table I, 7,751 persons (about 35%) of the population having a completed test were vaccinated ; of these, 4,795 persons (62%) belonged to the age-group 7-14, 2,135 (28%) to the age-group 0-6, and 821 (10%) to the age-group 15 years and over. Only 14 negatives were not vaccinated.

TABLE I. NUMBER OF PERSONS TUBERCULIN-TESTED AND VACCINATED WITH BCG IN ADEN COLONY DURING FEBRUARY-MAY 1952

Month	Population	Number starting test				Number completing test										Number not completing test
						Positive *			Vaccinated			Negative not vaccinated				
		Age-group (years)			Total	Age-group (years)			Age-group (years)			Age-group (years)			Total	
		0-6	7-14	15+		0-6	7-14	15+	0-6	7-14	15+	0-6	7-14	15+		
February	Schools	338	4,427	782	5,547	96	2,000	560	207	2,272	198	2	4	2	5,341	206
March	Schools	64	260	29	353	8	71	14	47	160	11	—	—	—	311	42
	Public centres	2,617	4,236	6,676	13,529	247	1,868	4,009	1,198	1,275	304	—	—	—	8,901	4,628
April	Schools	1	56	3	60	1	28	1	—	22	—	—	—	—	52	8
	Public centres	1,615	3,698	6,335	11,648	159	1,466	3,749	667	1,042	295	2	—	4	7,384	4,264
May	Public centres	38	34	78	150	2	10	56	16	24	13	—	—	—	121	29
Total	*Schools*	*403*	*4,743*	*814*	*5,960*	*105*	*2,099*	*575*	*254*	*2,454*	*209*	*2*	*4*	*2*	*5,704*	*256*
	Public centres	*4,270*	*7,968*	*13,089*	*25,327*	*408*	*3,344*	*7,814*	*1,881*	*2,341*	*612*	*2*	—	*4*	*16,406*	*8,921*
Grand total		*4,673*	*12,711*	*13,903*	*31,287*	*513*	*5,443*	*8,389*	*2,135*	*4,795*	*821*	*4*	*4*	*6*	*22,110*	*9,177*
Grand total (all ages)		*31,287*				*14,345*			*7,751*			*14*			*22,110*	*9,177*

* Persons reacting with 5 mm or more of induration to Mantoux 5 TU test.

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Post-Vaccination Examinations

Between 28 April and 17 May 1952, a retest survey was carried out in 22 of the 27 schools covered by the mass campaign. The schools selected for retesting were those in which individual cards had been used ; they included about 92% of the 2,917 schoolchildren vaccinated during the campaign.

The vaccinations were given during February 1952 in the schools where retesting was done ; the interval between vaccination and retesting thus ranged from 9 to 14 weeks. The vaccine used had been lots number 153, 154, 155, and 156. The retest work was performed by the two WHO team members ; the nurse gave and read all the tests, while the doctor measured the children's vaccination lesions on the first visit and examined for enlarged lymph-nodes on the second. Examination of the lymph-nodes was, however, made solely among boys and in 12 schools only. The cards were handled by a secretary, who recorded the findings dictated by the doctor and the nurse ; their readings were thus not influenced by knowledge of previous findings.

Mantoux tests with 5 TU of the Danish PPD lot number RT XXII were used. This dose was given in 0.1 ml of diluent, and, to permit accurate measurement of the volume injected, tight, non-leaking syringes were used. No re-vaccination was given.

The extent of the retesting survey was as follows :

Children starting retest and examined for vaccination lesion	2,032
Children completing retest	1,907
Children examined for enlarged lymph-nodes (boys only)	1,193

Of the vaccinated children in the schools surveyed, approximately 71% completed the retest ; in all, 25% of the total vaccinated population were retested. The sex proportion of the population retested is about 70% males and 30% females.

Results

Pre-vaccination tuberculin sensitivity

The basic pattern of the naturally acquired tuberculin sensitivity in Aden Colony schoolchildren is shown in fig. 1 by the frequency distributions of the size of induration of reactions to the Mantoux 5 TU test. Distributions are given for the age-groups 6-8, 9-11, 12-14, and 15-18 years.

The distributions have the bimodal form characteristic of unvaccinated populations. Each is divided into two groups : the children in one group

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744 have either no reaction or very small ones (negative reactors); in the other, the reactions are grouped rather symmetrically around a fairly large average reaction (positive reactors). However, as the separation of the tested population into " negative " and " positive " reactors is not absolute —the two groups overlap to some extent—an arbitrary dividing line has to be drawn at some point on the size scale. For the mass campaign, a reaction of 5 mm or more of induration to the 5 TU test was considered positive, as recommended by the WHO Expert Committee on Tuberculosis in September 1950.[1] And, as may be seen in the distributions, this corresponds quite well to the point of low frequency (6-7 mm) between the two modal groups in the populations tested.

The distributions in fig. 1 also show the effect of age on the relative proportions of persons with positive and negative reactions. About two-thirds of the children aged 6-8 years are in the left-hand (negative) group but, with increasing age, this group becomes smaller as the right-hand (positive) group becomes larger, so that about two-thirds of the children in the age-group 15-18 are found to be positive. More-detailed figures are given in table II and fig. 2, showing the increase in frequency of tuberculin reactors with age, from an average of about 33% positive at 6 years to 65% at 14 years. There appears to be little difference between the boys and the girls in the frequency of positive reactors at each age within this range.

As these results are based on the findings recorded on individual cards for children in 22 schools—mainly for the age-group 7-14 years—it is not known if they are representative for all children in this age-group in Aden Colony. No detailed information on age and size of reactions is available for the non-school population when group cards were used, as only the numbers of positive and negative reactors in each of the three age-groups (0-6, 7-14, and 15 years and over) were reported. The difference in percentage of positive reactors between the children aged 7-14 years tested in schools and in public centres—about 46% compared with about 59% (see table I)—may be a real one reflecting differences in economic and social conditions ; however, it must be remembered that, while most school-children completed their tests, a relatively large number of the non-school children did not return for the reading. If a high proportion were negative, the result would be a disproportionate number of positive reactors among those who did return. Moreover, the non-school groups possibly include a higher proportion of older persons and this, too, could account for a higher proportion of positive reactors.

Post-vaccination tuberculin sensitivity

The distribution of post-vaccination tuberculin reactions for all children retested is given in fig. 3 ; for comparison, the distribution of pre-vaccination

[1] World Health Organization, Expert Committee on Tuberculosis (1951) *Wld Hlth Org. tech. Rep. Ser.* 32. 10

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FIG. 1. FREQUENCY DISTRIBUTIONS BY SIZE OF REACTIONS TO INTRADERMAL 5 TU TESTS, BY AGE, AMONG SCHOOLCHILDREN IN ADEN COLONY

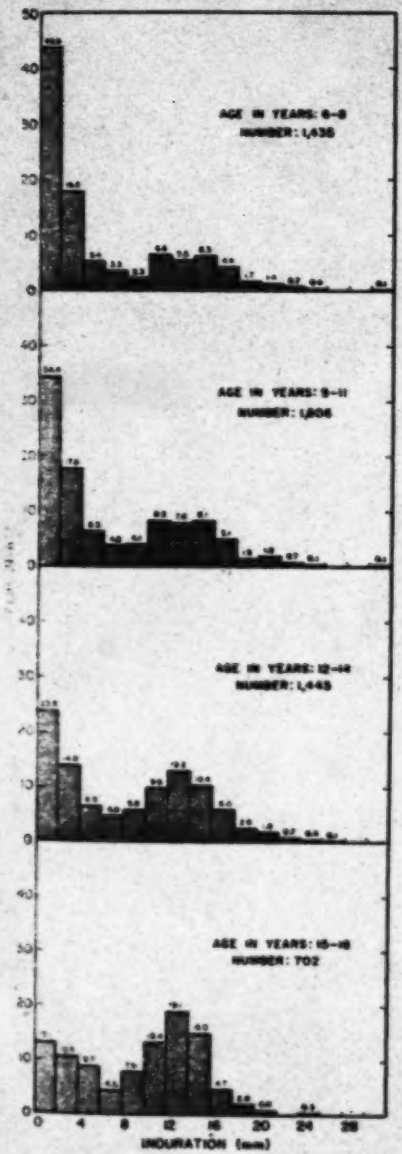
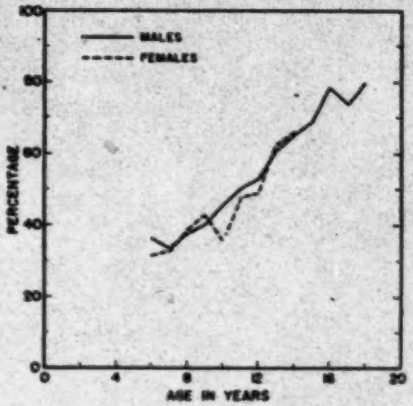
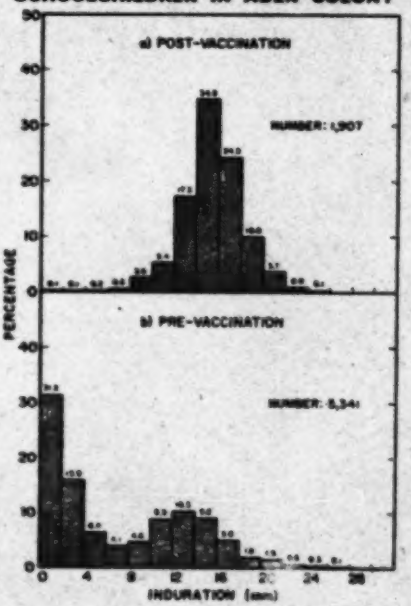


FIG. 2. PERCENTAGES OF TUBERCULIN POSITIVES, BY AGE AND SEX, AMONG SCHOOLCHILDREN IN ADEN COLONY*



* Positive reactions defined as 5 mm or more of induration to the intradermal 5 TU test.

FIG. 3. FREQUENCY DISTRIBUTIONS BY SIZE OF REACTIONS TO INTRADERMAL 5 TU TESTS IN VACCINATED (a) COMPARED WITH UNVACCINATED (b) SCHOOLCHILDREN IN ADEN COLONY



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● 744 TABLE II. RESULTS OF INTRADERMAL 5 TU TESTS IN SCHOOLCHILDREN, AGED 6-18 YEARS, IN 22 SCHOOLS IN ADEN COLONY, 1952

Age in years	Number completing test		Number of positives *		Percentage of positives	
	males	females	males	females	males	females
6 . . .	89	121	32	38	36.0	31.4
7 . . .	347	220	117	71	33.7	32.3
8 . . .	428	230	166	81	38.8	35.2
9 . . .	384	183	154	78	40.1	42.6
10 . . .	380	159	174	57	45.8	35.8
11 . . .	385	115	193	55	50.1	47.8
12 . . .	433	104	231	51	53.3	49.0
13 . . .	411	90	250	56	60.8	62.2
14 . . .	363	44	237	29	65.3	65.9
15 . . .	245	23	169	11	69.0	..
16 . . .	203	16	159	10	78.3	..
17 . . .	130	4	96	2	73.8	..
18 . . .	79	2	63	2	79.7	..

* Reactors with 5 mm or more of induration.
.. Percentages not given because of small figures.

tuberculin-test results is also given for the group from which those to be vaccinated were selected. There is a clear difference between the two distributions. The post-vaccination reactions are grouped fairly symmetrically around a central value in the right-hand part of the scale, thus constituting a unimodal distribution : the pre-vaccination reactions form a bimodal distribution. All, or almost all, the vaccinated children had acquired some degree of tuberculin allergy, and the position of the vaccinated group on the size scale corresponds rather closely with the position of the natural positive group in the unvaccinated population shown below. In fact, the modal reaction for the vaccinated is actually a few mm larger than that for the natural positives—14-15 mm compared with 12-13 mm. This difference may, however, represent differences between the readers, as the post-vaccination tuberculin tests were read by just one person, the pre-vaccination tests by three. Even so, it is evident from this material that the allergy induced by BCG vaccination may be about as strong as that produced by natural infection.

Table III gives the results for individual schools grouped according to vaccine lot number and by post-vaccination interval in weeks. The level of allergy produced may be characterized by the mean size of reactions, given at the bottom of the table for each school, and for each group of

TABLE III. DISTRIBUTIONS BY SIZE OF POST-VACCINATION REACTIONS TO INTRADERMAL 5 TU TESTS AMONG SCHOOLCHILDREN, BY VACCINE LOT NUMBER, POST-VACCINATION INTERVAL, AND SCHOOL, ADEN COLONY, 1952

Vaccine lot No.	153			154						155						156							Total
Post-vaccination interval (in weeks)	14		14	13			14	13		12	11					11	10	9	10				
Serial No. of school	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	all schools
Induration (mm)																							
0	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
3	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2
4	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
5	—	—	—	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	2
6	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	3
7	—	—	1	—	—	—	—	2	1	—	—	—	—	—	—	1	—	—	2	—	—	—	7
8	2	2	—	—	—	—	3	1	—	—	—	2	—	—	—	2	—	—	—	1	—	—	13
9	3	2	3	2	3	1	—	3	—	1	—	1	—	1	1	3	1	—	3	2	2	4	36
10	2	5	1	1	—	—	1	2	1	1	1	1	—	—	1	2	1	—	6	3	1	1	30
11	9	7	1	4	6	—	3	3	1	2	2	7	3	—	2	4	1	2	3	6	3	4	73
12	5	6	9	8	13	3	5	8	—	9	7	7	3	1	1	6	1	2	5	17	9	9	134
13	16	14	4	8	13	2	4	6	2	11	9	7	2	2	7	20	5	1	11	29	8	15	196
14	44	20	10	25	26	9	5	19	6	13	12	17	9	8	12	44	8	10	20	36	14	18	365
15	25	17	17	16	14	7	9	21	7	10	12	17	3	12	12	25	6	6	5	16	5	16	278
16	35	21	14	13	16	1	9	26	7	15	9	11	14	15	14	37	2	7	4	11	13	23	317
17	11	9	5	11	5	—	5	17	4	8	5	6	7	4	7	18	1	1	2	9	1	11	147
18	10	11	5	12	6	1	3	15	2	4	4	4	—	1	6	6	3	1	—	1	3	4	102
19	10	1	1	6	7	—	5	22	—	5	1	2	1	2	1	11	2	1	—	1	2	8	89
20	6	2	1	1	1	1	3	9	3	—	2	—	1	3	1	6	—	—	—	—	1	3	44
21	5	2	3	1	—	—	—	4	2	—	—	—	—	2	—	4	—	—	—	—	3	—	26
22	2	—	1	2	—	—	—	2	—	—	—	—	—	—	—	1	—	—	—	—	—	—	8
23	1	—	—	3	1	—	—	3	—	—	—	—	—	—	—	1	—	—	—	—	—	—	9
24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	2
≥25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	*187*	*120*	*77*	*113*	*111*	*25*	*56*	*168*	*36*	*79*	*64*	*82*	*43*	*52*	*65*	*193*	*30*	*31*	*62*	*132*	*65*	*116*	*1,907*
Mean size of induration	15.2	14.5	14.8	15.4	14.6	14.2	14.8	15.7	15.6	14.8	14.7	14.2	15.1	15.6	15.1	15.3	14.7	14.7	12.8	13.7	14.5	14.9	14.8
	14.9			15.2						14.8						14.5							

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744 schools where vaccination had been performed with the same lot of vaccine. There are only small deviations from the average value of 14.8 mm. Analysis of the results according to age and sex showed little variation with age, but the reactions were slightly larger for boys than for girls : 15.1 mm compared with 14.5 mm.

Local response to vaccination

Examinations for vaccinal lesions at the time of the retesting showed that all the children retested had a reaction at the site of vaccination.

The character of the reactions ranged from merely indurated lesions to crusted lesions and scars ; in some children (about 8%), examined 9-11 weeks after vaccination, unhealed ulcers were observed. As it is difficult to classify uniformly lesions examined at different intervals after vaccination, no attempt will be made to distinguish between the different type of lesions found.

To provide information on the size of the vaccinal lesions the frequency distribution by size (transverse diameter in mm) of the indurated lesions and scars is given below :

Vaccination lesion (mm)	*Number*	*%*
0- 1	0	—
2- 3	0	—
4- 5	91	4.50
6- 7	660	32.50
8- 9	752	37.00
10-11	359	17.60
12-13	133	6.60
14-15	26	1.30
16-17	9	0.40
18-19	0	—
20-21	1	0.05
22-23	1	0.05
Total . .	2,032	100.00

It appears that none of the vaccinal lesions measured less than 4 mm ; most of them were smaller than 14 mm and only a few larger than 17 mm. The average size (8.4 mm) varied but little among groups of children given different lots of vaccine and examined at different intervals after vaccination.

No complications at the vaccination site were reported ; nor did the examination for enlarged lymph-nodes in both the right and left axillary and supraclavicular regions reveal any complications. Non-suppurative nodes with enlargement of 2-2½ cm inclusive were, however, found in the right axillary region in 1.9%, and in the left in 1.3%, of the males examined (table IV). Most of the nodular enlargements were therefore probably not related to vaccination.

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TABLE IV. RESULTS OF EXAMINATIONS FOR REGIONAL LYMPH-ADENOPATHY 9-14 WEEKS AFTER VACCINATION (IN LEFT DELTOID REGION) AMONG BOYS FROM 12 SCHOOLS IN ADEN COLONY, 1952

Lymph-node findings in axillary and supraclavicular regions	Left side		Right side	
	number	%	number	%
No enlargement or less than 1 cm	996	83.5	982	82.3
Enlargement of				
1-1 ½ cm	181	15.2	188	15.8
2-2 ½ cm *	16	1.3	23	1.9
3 cm or larger	—	—	—	—
Total examined	*1,193*	*100.0*	*1,193*	*100.0*

* All found in the axillary region.

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The BCG-vaccination programme in Aden Colony was organized by Dr. E. Cochrane, formerly Director of Health Services, Aden Colony, on behalf of the Government. The programme was planned and technically supervised by Dr. Herbert Møller, BCG Adviser, World Health Organization Regional Office for the Eastern Mediterranean.

The field work reported in detail in this report was largely the responsibility of Dr. Knut Berg (WHO), Miss Agnes Bentsen (WHO), and Mrs. Jane Fazem (Aden). The post-vaccination tuberculin tests were given and read by Miss Bentsen; Dr. Berg measured the vaccinal lesions and examined for regional lymph-adenopathy.

RÉSUMÉ

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Une campagne de vaccination systématique au BCG a été entreprise à Aden, dès février 1952, par l'OMS et le FISE, en collaboration avec les services de santé gouvernementaux. Durant le premier mois, les tests et la vaccination ont été limités aux écoliers et aux jeunes adultes. Ils furent étendus, plus tard, au reste de la population. Les réactions de 5 mm et plus au Mantoux 5 UT ont été considérées comme positives. Toutes les précautions furent prises pour que la tuberculine et le BCG soient transportés à basse température et que le vaccin soit conservé et utilisé à l'abri de la lumière solaire.

La campagne avait pour but de soumettre aux tests tous les habitants de 1-18 ans. Ce but ne put être réalisé que pour environ la moitié d'entre eux. On vaccina 35% des sujets soumis à l'épreuve prévaccinale. En avril-mai 1952, soit 9-14 semaines après la vaccination, on procéda aux tests postvaccinaux.

La courbe de distribution des réactions prévaccinales présente le caractère bimodal caractéristique des populations non vaccinées : environ deux tiers des enfants de 6-8 ans sont « négatifs ». Leur nombre diminue avec l'âge, de sorte que deux tiers environ des enfants de 15-18 ans sont « positifs ».

La courbe de distribution des réactions à l'épreuve postvaccinale est unimodale. Presque tous les enfants vaccinés avaient acquis un certain degré d'allergie, comparable à celui que l'on avait observé chez les enfants positifs à l'épreuve prévaccinale.

Tous les enfants présentaient des réactions locales, allant de la simple induration à des croûtes et cicatrices. Chez 8% d'entre eux, des ulcères non cicatrisés ont été observés. Aucune complication ganglionnaire n'a été notée.

H 364 shafts lead from lavatories in the upper stories to a reception chamber on the ground floor, is widely used in the larger houses in Western Aden Protectorate and the Hadhramaut. Pit or surface privies are sometimes found in the courtyards of the smaller houses, but the majority have no facilities for the disposal of sewage wastes. Indiscriminate pollution of the soil is a general practice.

Fauna and Flora

A 659 Few entomologic surveys have been made in this region, and data regarding the insect vectors and animal hosts of human disease are fragmentary. It is probable, however, that the species identified in the neighboring territories are present in Aden Protectorate under similar physiogeographic conditions.

A 136 164 Arthropods. Mosquitoes. *Anopheles adenensis* (— *A. culicifacies adenensis*) is the most important anopheline mosquito in Aden Colony. Although it has been eradicated from Aden and Sheikh Othman townships, it persists in near-by oases, and is a major vector of malaria wherever it is encountered. In the last local outbreak in the *kutcha* hut district of Sheikh Othman, *A. adenensis* was found breeding in large numbers in the soakpits. It normally breeds A [744] in wells, shallow cisterns, irrigation canals and sluggish streams, and, before the institution of effective control measures, had become adapted to the high salinity of the saltpan seepages.

H 136 164 *A. gambiae* is widely distributed in the Protectorate, where it probably acts as the principal vector of malaria. It breeds along the edges of pools and streams, in irrigation canals, in wells and in numerous other collections of water. *A. turkhudi*, *A. coustani*, *A. d'thali*, *A. pretoriensis* and *A. barbirostris* have also been reported from various localities.

Aedes aegypti, the usual urban vector of yellow fever elsewhere, and *A. vittatus*, a tree-hole breeder implicated in the transmission of yellow fever in endemic foci in

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Africa, are found in the coastal area. Numerous species of *Culex* are present, including *C. quinquefasciatus* (— *C. fatigans*), a potential vector of filariasis. A species of *Taeniorhynchus* has been described from Western Aden Protectorate.

Mosquito control measures have been carried on by the health authorities in the Colony for several decades. They involve weekly inspections of all premises to eliminate breeding sites, the protection and the larvicidal treatment of permanent bodies of water, the reclamation of swamps and low-lying lands in the vicinity of the towns, and the supervision of the dhows using the port. The Aedes index was 0.014 per cent in 1950, in contrast with 4 per cent in 1930.

Flies. Flies are abundant in towns and villages, where the insanitary conditions around markets, cattlesheds and dwellings favor prolific breeding. They are most numerous between November and March. The house flies, *Musca domestica* and related species, are ubiquitous and undoubtedly play a role in the spread of intestinal and eye infections. The stable fly, *Stomoxys calcitrans*, is prevalent. Sandflies are numerous, among which *Phlebotomus papatasii* is presumably of primary medical concern. The tsetse fly, *Glossina tachinoides*, was reported early in this century from the Haushabi and the Subeihi tribal districts in Western Aden Protectorate.[9] It has not been collected in recent surveys, however, and the original observations remain the only record of its appearance outside Africa.[20] Campaigns against flies, employing DDT, Gammexane and other insecticidal sprays in markets and public buildings, are undertaken periodically by the health authorities in the two townships of the Colony.

Lice. All forms of human lice are found, particularly among the inhabitants of towns and villages in the interior. *Pediculus humanus corporis* is prevalent in the highland villages, where it is the vector of louse-borne typhus and louse-borne relapsing fever.

Fleas. Both *Xenopsylla cheopis* and *X. astia* parasitize the rats in this region.

They are potential vectors of plague, but no cases have been recorded for several decades. The human flea, *Pulex irritans*, is common and has been suspected of transmitting plague from man to man in past outbreaks. Species of *Ctenocephalides* undoubtedly occur, as in the adjacent territories.

Ticks and Mites. Several species of ticks infest both wild and domestic animals in the rural areas. The human itch mite, *Sarcoptes scabiei*, is unusual among the schoolchildren in the Colony, although it is widespread in the poor communities in Yemen and the Protectorate.

Reptiles. The puff adder, *Bitis arietans*, inhabits some portions of the western highlands. The carpet viper, *Echis coloratus*, and the sand vipers, *Aspis cerastes* (— *Cerastes cornutus*) and *A. vipera* (— *C. vipera*), are described from southern Arabia, but their prevalance within Aden territory is uncertain.

Rodents. *Rattus rattus rattus* and *R. rattus alexandrinus* are widely distributed. At least 90 to 95 per cent of the rats captured in the Colony have been identified as *R. rattus*. In spite of the diversity of shipping activities, *R. norvegicus* is seldom encountered. Active measures for the destruction of rodents in the bazaars and the dwellings in the towns and on the dhows visiting the port are carried on by the Colonial health authorities. No controls are exercised over the larger vessels, which have to anchor in the harbor. A representative proportion of the captured rodents are examined annually for evidence of plague.

Wild rodents are common, including species of *Meriones*, *Jaculus* and *Gerbillus*.

Molluska. Foci of *Schistosoma haematobium* and *S. mansoni* infection exist in Western Aden Protectorate, but the intermediate snail hosts have not been positively identified. Planorbis and Bulinus snails have been reported from Mukeiras and Museimir, and Bulinus from the Dhala' plateau. *Melanoides tuberculata* and other species are found in several areas.

M1 Middle East

ADEN MM1
HADHRAMAUT MM2

Plants. The shrub, *Catha edulis*, colloquially known as *qat*, is extensively cultivated in sections of the western highlands. The leaves yield a stimulant which dissipates fatigue and causes loss of appetite and of desire for sleep. Qat chewing is a popular custom in the Colony and Western Aden Protectorate, as it is in Yemen. N A 135 733

Cases of poisoning, caused by the contamination of imported wheat with grains of *Lolium temulentum* (Darnel grass), are recorded frequently. Species of *Euphorbia* grow in many areas, and contact poisoning is sometimes observed. H A 136 752

Food Sanitation

Regulations governing the sanitary quality of milk, meats and other products are in force only in the Colony. The markets and the slaughterhouses, which are located at four points—in Crater, Tawahi and Maala, on the peninsula, and in Sheikh Othman—are operated under the supervision of sanitary inspectors. Eating houses, coffee shops, date stalls and other premises where foods are prepared or sold, and the aerated water and ice factories, are licensed and inspected from time to time. No controls are exercised over food handlers, however, and many food vendors and workers in small shops are immigants among whom the standards of cleanliness are generally poor. A 744

Meat animals are inspected by veterinary officers at the slaughterhouses, but no postmortem examinations of the carcasses are made. The dairy cows are housed in municipal or private sheds within the town limits. Samples of milk from commercial herds are collected at regular intervals and tested for adulteration. There are no facilities for pasteurization. Opportunities for the spread of infection through contaminated milk are minimal, however, due to the universal custom of boiling milk before it is used. Brucellosis is enzootic among the goats, and infections undoubtedly are transmitted to man occasionally through cheese and other milk products. Bovine tuberculosis is pres- A 744 234

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ent in the dairy cattle of the Colony, but the rate of infection is believed to be low.

HEALTH SERVICES AND MEDICAL FACILITIES

Health Organizations

A 744 L67

Responsibility for the health of the civilian population in the Colony resides in its Medical and Health Department, which is administered by a Director of Medical Services, with headquarters in the town of Aden. He is advised on matters of policy by the medical staff in the Colonial Office in London. The department is divided into medical, public health and port health divisions. The functions of the medical division involve the maintenance of hospitals and dispensaries and the conduct of a school health program. The public health division undertakes mosquito and rodent control services, and supervises the sanitation in the townships, while the port health division is concerned with the enforcement of quarantine regulations and the medical care of visiting seamen.

H 744 L67

No formal health organization exists in the Protectorate, but a degree of co-ordination with the Colonial services in Aden has developed within recent years. In Eastern Aden Protectorate, medical care facilities are supported by the sultanate governments or by local rulers, with the guidance and advice of an Assistant Director of Medical Services, who is peripatetic, but usually works from a base at Mukalla. A qualified medical officer is stationed at Mukalla, the seat of government of the Qu'aiti Sultanate. With the exception of a dispensary in Lahej, which is financed by the Sultan, the medical services in Western Aden Protectorate are carried on by the British authorities, in co-operation with the Church of Scotland mission at Sheikh Othman.

A 747

Local voluntary organizations participate in the health activities of the Colonial government. The Aden Nursing Association contributes to the support of nursing serv-

A 165 167 854 H6 thorities regard undernutrition and incorrect methods of feeding as important underlying factors. The deaths in infants under 1 year of age totaled 175 in 1950, or about 44 per cent of the known dysentery deaths.

H 164 No precise information is available regarding bacillary and amebic dysentery in the Protectorate, but the high rate of infection among visitors to Aden Colony suggests that both are widespread.

A 164 361 744 Cholera. Cholera has not been reported from Aden within the present century, although outbreaks have followed its introduction in the past. Since no record exists of its presence in the Hadhramaut, it is probable that the disease was largely confined to the port towns.

During the 1947 outbreak in Egypt, traffic through Aden was increased due to the quarantine restrictions imposed on Egyptian ports. Special precautions were taken by the health authorities to prevent the admission of infected individuals or goods by sea, land or air routes. Immunization against cholera was also provided for all persons handling shipping and for all health service personnel.

A 731

H 164 Helminthiases. SCHISTOSOMIASIS. Schistosomiasis is endemic in scattered localities in Western Aden Protectorate, especially in the highland districts above 2,000 feet elevation. Foci of *Schistosoma haematobium* are known to exist in the Jebel Jehaf and Dhala' plateau country, in the Wadi Tiban area around Museimir, and in the vicinity of Tor am Baha, Huweni and Khor 'Umeira. *S. mansoni* is apparently more restricted in distribution, but it is found in the Jebel Jehaf and the Wadi Tiban regions.

A 164 No locally acquired infections are reported from the Colony, although numerous cases among persons from the interior are treated in the civilian hospitals each year. A large proportion of the cases seen in Aden Colony come from Yemen or from the Dhala' and the Museimir districts.

H A 136 The intermediate snail hosts of *S. haematobium* and *S. mansoni* have not been definitely established, but Bulinus and Planor-

ADEN MMI

urban communities in the Middle East. Pulmonary infections predominate, but other forms of the disease are also observed.

Tuberculosis is widespread in the immigrant populations in Aden, as shown by the fact that 58 to 70 per cent of the cases of pulmonary tuberculosis recorded in the three years 1948-50 were in nonresidents. Among the 530 cases reported in 1950, Aden was the place of origin in 152, Yemen in 193, Western Aden Protectorate in 99, Eastern Aden Protectorate in 12, and Somaliland, India and other countries in the remainder. In the decade 1941-50, the number of deaths attributed to pulmonary tuberculosis ranged from 113 to 261 a year, with peaks of prevalance associated with large migrations of immigrants.

Although tuberculosis has long been regarded as a major cause of sickness and death in the Colony, few facilities for diagnosis and treatment existed before 1945. In that year, the health authorities initiated a campaign for the reduction of tuberculosis in all ecopomic groups of the population. The diagnostic services were reorganized and X-ray equipment provided. Special wards were also added to the civilian hospitals; the number of beds available for the treatment of tuberculosis was increased from 18 in 1945 to 150 in 1951. As a further preventive measure, a program of supervised domiciliary treatment was introduced in 1947 to furnish care to persons who could not be hospitalized.

Following the organization of the antituberculosis campaign, there was a decrease in the specific death rates from around 29.3 per 10,000 population in the period 1931-44 to 11.3 in 1950. In the latter year, the corrected rate for the local population alone was 8.4 per 10,000. A tuberculin testing and BCG inoculation program was planned for 1952 by the Medical and Health Department, in co-operation with the World Health Organization.

Smallpox. In spite of the fact that localized epidemics of smallpox are recurrent in the Protectorate, no outbreaks have been

ADEN MM1
HADHRAMAUT MM2

Diseases Spread by Arthropods

Malaria. Little or no indigenous malaria exists at present in the Colony. From 1,000 to 2,000 malaria patients are treated each year in the civilian hospitals and dispensaries, but, with the exception of occasional cases of questionable origin, the infection has almost invariably been acquired outside the limits of the Colony, usually in the interior. Until recent decades, malaria was highly endemic in the oasis of Sheikh Othman and surrounding villages, and sporadic outbreaks were experienced in the town of Aden. Anopheline control work was initiated in 1909 and extended on a colony-wide basis in the 1930s. As a result, the disease was early eliminated from Aden, while its prevalence was progressively reduced in Sheikh Othman. The number of local cases treated at the Keith Falconer Mission Hospital declined from almost 2,000 a year in 1907 to zero in 1950. The last outbreak of malaria was recorded in 1943 among the transient laborers living in *kutcha* hut settlements in Sheikh Othman. At that time, *Anopheles adenensis* (— *A. culicifacies adenensis*), the principal vector, was found breeding in the soakpits. Antianopheline measures are carried on continuously in the Colony and adjacent sections of the Protectorate, and vector species have been eradicated almost completely.

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H A 744

Malaria occurs in most portions of the Protectorate, exclusive of the desert regions and the mountainous areas at the higher elevations. In the 1939-40 survey of Western Aden Protectorate, all gradations of endemicity were encountered. In general, the infection was hyperendemic in the vicinity of perennial streams and moderately endemic in villages around wadies which remained dry for most of the year. The splenic index ranged from 40 to 92 per cent in different localities. Extensive epidemics have been recorded from the highland districts, especially from the Dhala' and the Yafa'i country. Both *Plasmodium falcip-*

H 164

H 164 136

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H 164 136 arum and *P. vivax* are found in most regions, but *P. malariae* is apparently relatively rare. *A. gambiae* is widely distributed, and is regarded as the principal vector in the Protectorate.

H A 164 Rickettsial Infections. Louse-borne typhus has been recognized in the highlands of southwestern Arabia since 1939, and occasional imported cases are admitted to hospitals in the Colony. In 1944-45, epidemics of typhus were recorded from Western Aden Protectorate which were secondary A 164 167 744 to foci in Yemen. The disease first appeared in Aden in January, 1944, among Jewish emigrants who had traveled overland from Yemen and were awaiting transport to Israel. Fifteen cases were reported, all but 2 of which were members of the Jewish community. The movement of Yemenis across the frontiers was restricted, and a camp at Lahej which at that time harbored some 1,600 Jewish emigrants was transA 167 758 744 ferred to a quarantine site in the desert. Sick individuals from the Jewish quarters in the town were removed to the camp, and wholesale delousing measures were enforced both at the camp and in infected areas in the town. The spread of the infection in the Colony was curtailed, but new outbreaks developed in the Amiri and the Subeihi tribal districts, near the Yemeni border, and progressed along the trade routes to within 40 miles of Aden Colony. The importance of the port and military installations during the prevailing war emergency necessitated the creation of a sanitary cordon to isolate the Colony from the interior.

A 164 744 The infection persisted in epidemic form in the Protectorate, spreading eastward to the Dhala' plateau and the mountainous villages of the Lower Yafa'i country. In many localities, 10 to 25 per cent of the inhabitants are believed to have suffered from the disease. Insecticidal powders, as well as antityphus vaccine, were supplied by the United States Typhus Commission, and mass dusting campaigns were carried on in the villages visited by the medical

officers. Special delousing stations were established along the 3 main trade routes from Yemen to guard against the development of new foci.

The prevalence of the infection diminished during the summer months, but sporadic outbreaks were again reported in the winter of 1944-45. Early in 1945, a series of permanent dispensaries was organized in Western Aden Protectorate, and the tribal dressers in charge were trained to undertake mass dusting of the populace with DDT powder in the event of further epidemics. No outbreaks of typhus have been reported from the Protectorate since 1945, although the disease has continued to smolder in Yemen.

Murine typhus is probably endemic. Suspected cases have been observed in Aden hospitals from time to time, but the diagnosis has not been confirmed by laboratory diagnosis.

Plague. Six outbreaks of plague have been recorded from the Colony within the present century—in 1899-1900, 1903-04, 1904-05, 1913-14, 1917-18 and 1927-28. The most serious epidemics were those of 1904-05, involving 2,299 known cases, and of 1927-28, with 1,494 cases and a fatality rate of 74 per cent. In each outbreak the initial cases were detected among dock laborers employed in moving cargo or in loading or unloading coal. Since evidence of a preliminary rat epizootic was lacking, the local authorities concluded that the disease had been introduced by infected workers or by individuals carrying infected fleas. It was considered probable that the rat infection was secondary to the human. The morbidity rates almost invariably reached a peak in February or March, and declined with the onset of hot weather. No plague has been reported from the Colony since 1928, but the danger of its importation by means of dhow traffic from endemic ports in Africa and the East is always present. The Medical and Health Department carries on an active rat control program, and examines significant numbers of captured rats each

year for evidence of plague. The disease has not been reported from the Protectorate. H A 744

Other Infections. Localized outbreaks of louse-borne relapsing fever have been recorded from the Protectorate, but no indigenous cases have been encountered in Aden. Cases of relapsing fever were frequently discovered at the time of the typhus outbreaks in 1944-45. H A 164

Occasional cases of kala-azar are seen in the Colony hospitals, usually among immigrants from Yemen. Two cases, in which the diagnosis of kala-azar was confirmed by spleen puncture, were recently reported from the Civil Hospital.[10] Both originated in southern Yemen, one from the vicinity of Ta'izz and the other from a village near the border of Western Aden Protectorate. Sporadic cases of Oriental sore are also treated in Aden, but the extent of infection in the interior is uncertain. H A 167 164

Cases suspected of being sandfly fever are common. The vector, *Phlebotomus papatasii*, is widely distributed. Guinea worm infection is endemic in the Hadhramaut and in certain coastal districts in the Protectorate. Imported cases are often observed in Aden Colony. Travelers from endemic centers in Africa thought to be suffering from yellow fever are sometimes admitted to the Colony hospitals, but no indigenous cases have been reported.

Nutritional Diseases

A 146 464 511 361

Undernutrition is prevalent, particularly among the immigrant laborers in Aden and the poorer villagers and the Bedouin in the interior. Few studies of the prevalence of nutritional diseases have been made, but, in view of the inadequate diet of large sections of the population, deficiency conditions are probably numerous, particularly as regards protein and vitamins C, A and riboflavin of the B complex. Rickets is common in the Protectorate, while minor symptoms of the disease were detected in 17 per cent of 264 schoolchildren examined in Aden township in 1945. Spongy gums, gingivitis and other signs of vitamin C de- A H 146 164

ADEN MMI
HADHRAMAUT MM2

N 744 Responsibility for the health of the people in the Colony resides in its Medical and Health Department, which is administered by a Director of Medical Services, with headquarters in Aden. There are no organized public health services in the Protectorate. Medical facilities are supported mainly by the British authorities in Western Aden Protectorate and by the local A 743 rulers in Eastern Aden Protectorate. As of 1950, there were 4 hospitals, with an aggregate capacity of about 600 beds, in the Colony which served the local residents and accessible portions of the Protectorate. In addition, several government, mission or private dispensaries, 2 venereal disease treatment centers and a maternity and child A welfare clinic were in operation. The Pro- 743 tectorate facilities included 2 small hospitals, a child welfare center and 15 dispensaries in Eastern Aden Protectorate: 18 dispensaries in Western Aden Protectorate.

N A 312 Water supplies are scarce throughout this region, except in portions of the western highlands. The water supply for the Colony is derived from boreholes and treated by chlorination. Supplies in the Protectorate are obtained from streams, springs, wells A or rain-water cisterns. The methods of sew- H 364 age disposal are primitive in the Colony, 744 as well as in the Protectorate. Limited sanitary controls over the production and the distribution of foodstuffs exist only in THE COLONY.

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